

Ohio, and Tennessee; iv., Michigan, Minnesota, and Wisconsin; v., Dakota, Iowa, Kansas, Missouri, Montana, and Nebraska. Column two shows the mean number of stations in each district for twenty years. Column three shows the mean number of storms at each station. Columns four and five give stations and mean number of storms for 1884. Column six gives the excess of stations in the present year, and the last column gives the excess or deficiency in storms for 1884 as compared with the mean of twenty years. Every district but one, it will be noted, shows an increase. The large deficiency in district ii. is readily accounted for when we consider that in this district there has been a protracted drought, and the conditions producing that were unfavorable to the development of thunder-storms.

TABLE II.—Mean number of thunder-storms per station in all districts for September.

Year.	Stations.	No.	Departure.	Magnetic Declination.	Departure.	Year.	Stations.	No.	Departure.	Magnetic Declination.	Departure.
1851.....	46	2.22	— .16			1864.....	37	2.24	— .30	3.40	— .18
1852.....	32	1.94	— .45			1865.....	70	2.08	— .30	2.67	— .55
1853.....				4.29	1.07	1866.....	94	1.83	— .55	2.59	— .63
1854.....	90	2.64	.26	3.21	— .01	1867.....	106	1.59	— .79	1.81	— 1.41
1855.....	58	2.89	.51	3.23	.01	1868.....	105	2.43	.05	2.94	— .26
1856.....	70	2.10	— .38	2.72	— .50	1869.....	89	1.97	— .41	2.84	— .38
1857.....	65	2.74	.36	3.79	.57	1870.....	33	2.39	.01	4.09	.87
1858.....	57	2.02	.33	2.83	— .01	1871.....	90	1.41	.57	3.39	.17
1859.....	56	2.10	— .38	3.71	.49	1872.....	133	3.74	.49	4.00	.78
1860.....	73	2.71	.33	3.59	.37	1873.....	95	2.54	.16	3.15	— .07
1861.....	83	2.45	.07	3.72	.50	Mean.....		2.58		3.22	
1862.....	40	2.32	— .06	2.98	— .24						
1863.....	63	2.13	— .25	2.04	— .58						

In order to determine the relation, if any, between thunder-storm action and fluctuations of the earth's magnetism Table ii. has been prepared. This shows in column one, the year; in column two, the total number of stations reporting thunder-storms; in column three, the mean number of storms per station; in column four, the departure from the mean for twenty-two years (a minus sign indicating deficiency); in column five, the mean diurnal range of the magnetic declination at Trevandrum, and in column six, the departure from the mean. It will be seen that with two exceptions the maximum and minimum points in the two phenomena coincide. This would seem to show a relation between the two and the necessity of observing fluctuations of the magnetic needle in connection with detailed observations of atmospheric electricity.

OPTICAL PHENOMENA.

SOLAR HALOS.

Solar halos were observed in the various states and territories, as follows:

Arkansas.—Fort Smith, 13th; Lead Hill, 13th, 18th, 22d, 25th, 28th, 30th.

California.—San Francisco, 4th, 14th, 17th, 19th, 30th; Cape Mendocino, 14th; Oakland, 14th, 30th.

Florida.—Pensacola, 1st, 4th, 13th; Archer, 10th.

Idaho.—Boisé City, 2d, 17th, 30th.

Illinois.—Riley, 14th; Anna, 27th.

Indian Territory.—Cantonment, 22d.

Iowa.—Davenport, 27th.

Kansas.—Sherlock, 22d.

Louisiana.—New Orleans, 3d.

Michigan.—Escanaba, 1st, 5th, 14th, 21st, 22d, 26th, 30th; Ann Arbor, 12th.

Minnesota.—Moorhead, 21st, 22d; Saint Vincent, 21st, 22d.

Nebraska.—Red Willow, 5th.

New Jersey.—Moorestown, 24th.

New York.—Buffalo, 4th, 15th, 19th, 22d, 23d; Oswego, 23d.

North Carolina.—Hatteras, 11th, 14th, 20th.

Ohio.—Toledo, 26th; Wauseon, 27th.

Oregon.—Albany, 4th, 26th.

Pennsylvania.—Erie, 15th, 23d.

South Carolina.—Stateburg, 4th, 26th.

Tennessee.—Nashville, 3d, 5th, 19th, 28th, 30th; Knoxville, 5th, 7th; Milan, 26th, Chattanooga, 30th.

Virginia.—Cape Henry, 4th, 6th, 24th; Dale Enterprise, 15th, 19th, 23d, 29th.

LUNAR HALOS.

Lunar halos were observed in the various states and territories as follows:

Alabama.—Mobile, 29th.

Arizona.—Wickenburg, 1st, 2d; Fort Apache, 3d; Fort Grant, 12th.

Arkansas.—Lead Hill, 28th, 30th.

Colorado.—Grand Junction, 2d, 3d.

Dakota.—Deadwood, 11th.

Delaware.—Delaware Breakwater, 26th, 28th, 29th, 30th.

District of Columbia.—Washington City, 28th, 30th.

Florida.—Jacksonville, 1st, 2d, 28th, 29th, 30th; Cedar Keys, 1st, 4th; Pensacola, 2d; Key West, 2d, 3d, 6th, 8th; Archer, 6th; Limona, 6th.

Georgia.—Atlanta, 2d, 30th; Athens, 28th; Augusta, 28th.

Idaho.—Boisé City, 5th, 7th, 27th; Lewiston, 30th.

Illinois.—Riley, 3d, 14th, 26th, 27th; Anna, 28th; Chicago, 30th.

Indiana.—Jeffersonville, 2d to 5th, 28th; Wabash, 5th, 6th, 7th, 27th, 28th; Sunman, 28th.

Iowa.—Fort Madison, 26th.

Kansas.—Yates Centre, 5th; Fort Scott, 6th; Westmoreland, 17th; Salina, 27th; Allison and West Leavenworth, 30th.

Kentucky.—Louisville, 3d.

Louisiana.—New Orleans, 2d, 5th; Point Pleasant, 2d, 28th, 29th; Liberty Hill, 29th.

Maine.—Orono, 5th.

Maryland.—Ocean City, 23d, 28th; Woodstock, 28th.

Massachusetts.—Taunton, 4th, 5th, 28th.

Michigan.—Port Huron, 1st, 2d, 10th; Alpena, 3d; Ann Arbor, 30th; Hudson, 30th; Lansing, 30th.

Mississippi.—Vicksburg, 2d, 29th.

Missouri.—Saint Louis, 28th.

Montana.—Poplar River, 7th.

Nebraska.—Yutan, 5th.

New Jersey.—Sandy Hook, 4th; Somerville, 29th.

New York.—Albany, 27th.

North Carolina.—Brevard, 2d, 3d, 5th, 6th; New River Inlet, 4th; Flat Rock, 4th, 5th; Kitty Hawk, 28th; Stateville, 30th.

Ohio.—Wauseon, 4th, 30th; Cincinnati, 28th; Cleveland, 30th; Toledo, 30th.

Oregon.—Roseburg, 27th.

South Carolina.—Stateburg, 3d, 28th, 30th.

Tennessee.—Nashville, 3d, 4th, 5th, 7th, 24th, 27th, 29th, 30th; Chattanooga, 3d, 29th, 30th; Knoxville, 5th, 7th, 30th; Ashwood, 28th, 30th; Milan, 28th.

Texas.—Fort Stockton, 1st; Indianola, 1st to 5th, 25th; Rio Grande City, 4th; Palestine, 5th; Cleburne, 5th, 7th; Brownsville, 7th.

Utah.—Nephi, 1st, 2d, 3d; Salt Lake City, 2d, 28th, 30th.

Virginia.—Cape Henry, 2d, 3d, 6th, 28th; Chincoteague, 3d, 4th, 6th; Wytheville, 4th, 6th, 28th; Johnstown, 22d, 23d, 25th, 27th to 30th; Dale Enterprise, 26th, 28th, 29th, 30th; Norfolk, 28th.

Washington Territory.—Port Angeles, 2d; Spokane Falls, 28th.

Wisconsin.—Sussex, 27th.

Wyoming.—Cheyenne, 2d.

MIRAGE.

Guttenburg, Iowa, 3d.

Northport, Michigan, 21st.

Sterling, Kansas, 30th.

MISCELLANEOUS PHENOMENA.

SUNSETS.

The characteristics of the sky, as indicative of fair or foul weather for the succeeding twenty-four hours, have been observed at all Signal Service stations. Reports from one hundred and fifty-eight stations show 4,701 observations to have been made, of which one was reported doubtful; of the remainder, 4,700, there were 4,047, or 86.1 per cent., followed by the expected weather.

The peculiar sunsets have continued during September, the